Reagan Picks Dense Pack MX Missile Basing Mode

By Clarence A. Robinson, Jr.

Washington—President Reagan sent to Congress last week a plan to deploy the MX advanced intercontinental ballistic missile in closely spaced basing in a column array with 100 missiles initially contained in 100 superhardened capsules. The column array would be located adjacent to Warren AFB, near Cheyenne, Wyo.

Defense Dept. and Air Force officials joined the President in emphasizing that closely spaced basing, formerly called Dense Pack, would provide a highly survivable land-based nuclear weapons deterrent. MX could force on the USSR a fundamental change in strategic weapons planning and lead toward meaningful strategic arms reductions, according to the officials.

Survivability and the hardness levels that can be achieved with missile capsules are crucial to the new ICBM force's credibility. The superhardened MX capsules would be placed 1,800 ft. apart in an array 14 mi. long by 1 mi. wide.

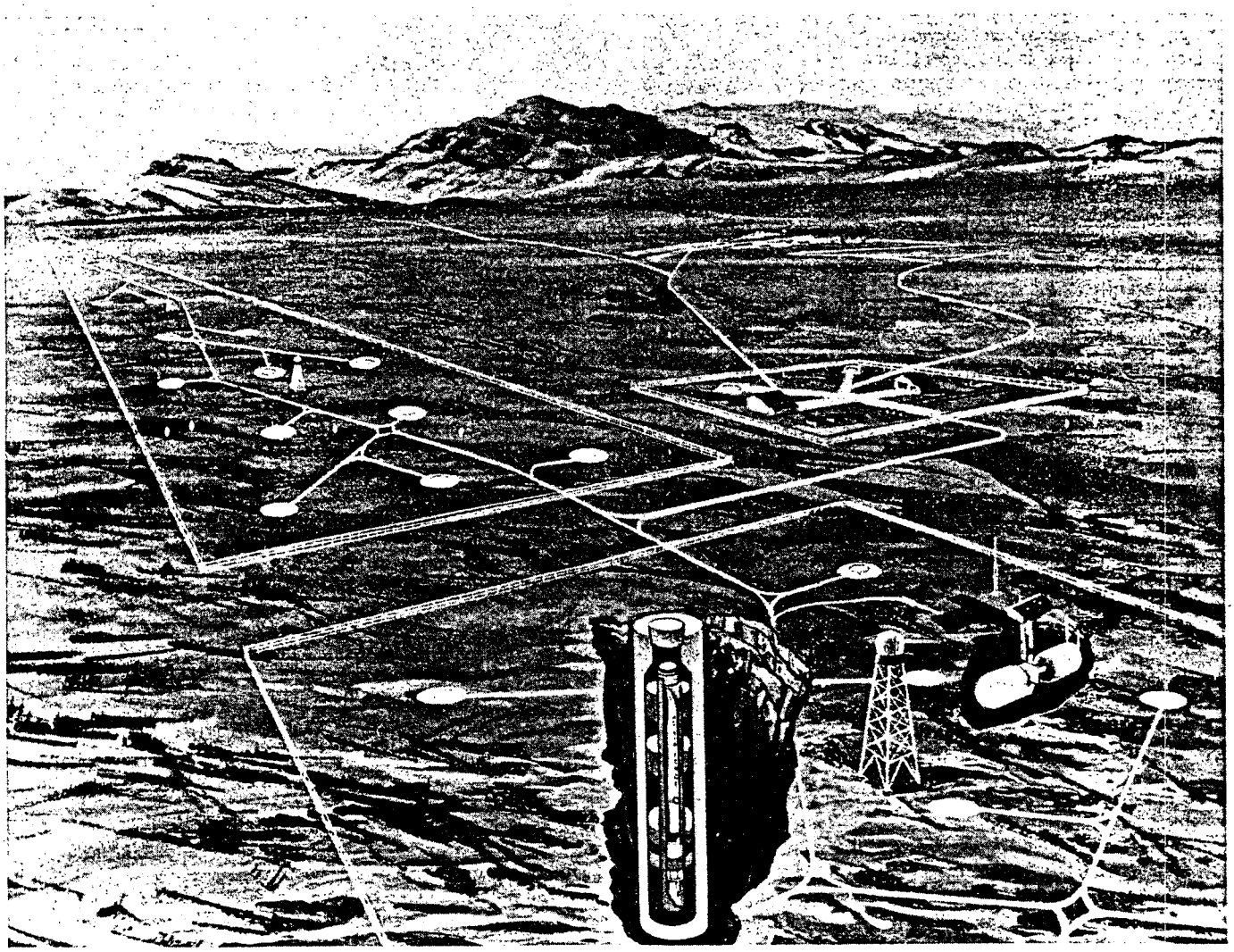
The close spacing of the capsules would take advantage of the phenomenon known as fratricide, in which detonation of incoming Soviet reentry vehicles provides nuclear effects that degrade or destroy other incoming warheads.

The combination of hardness, close spacing of capsules and the column array would assure the U. S. that more than 50% of the missiles would be able to ride out a first strike attack by the USSR, leaving a prompt counterforce weapon with sufficient accuracy to place the Soviet ICBM force in jeopardy.

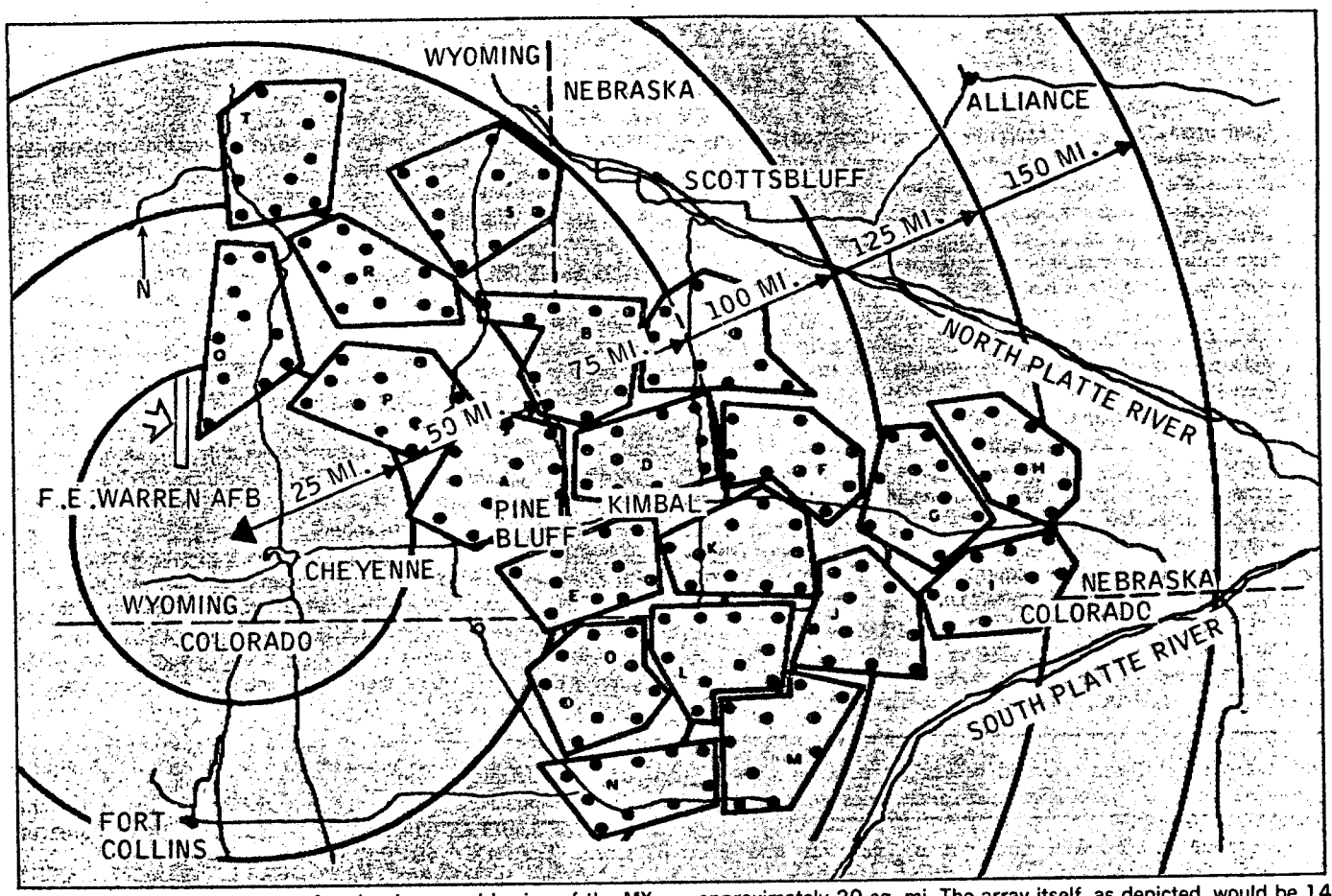
USAF officers calculate that up to 80% of the MX force in the column array would survive an attack. That figure is based on hardening MX capsules to 5,000 psi. to surface detonation and to 200 psi. per sec. to airbursts (AW&ST Nov. 22, p. 16).

Administration officials stressed last week that a series of capsule-hardness tests by the Defense Nuclear Agency has provided confidence that the hardness levels required to survive a Soviet nuclear strike can be achieved. Additional testing is scheduled for December with subscale capsules using conventional explosives to generate the blast overpressures and shock waves associated with Soviet nuclear weapons yields.

The MX capsule is being designed to



Closely spaced column array for basing the Air Force MX advanced intercontinental ballistic missile is depicted in an artist's concept with 100 superhardened capsules, each containing an MX in its launch canister. The array will be located on private lands adjacent to Warren AFB, Wyo. The capsules will be spaced 1,800 ft. apart. The area support center is adjacent to the missile field, with a building for equipment support, security and weapons storage. The cutaways in the drawing below show a single superhardened capsule in the closely spaced column array and the missile launch control center that houses missile crewmembers and launch equipment.



Location of the column array for closely spaced basing of the MX advanced ICBM is depicted in a drawing to scale with the array northwest of the Strategic Air Command air base. The size of the basing array for MX in relation to existing USAF/Boeing Minuteman fields to the north and east shows the amount of land involved for MX, approximately 20 sq. mi. The array itself, as depicted, would be 14 mi. long and 1 mi. wide. Each of the Minuteman squadrons contains 10 missile silos and a launch control facility. Three sites are being considered for the MX near Warren AFB, two northwest with the array running north-south, and one north with the array running east-west.

withstand a 25-megaton Soviet warhead, and officials at the Defense Dept. said that a single Soviet warhead with this yield could not destroy more than one MX capsule in the column array.

Eventually, the Air Force will test a full-scale MX capsule with the missile to substantiate subscale testing. But the Defense Nuclear Agency has been able to recreate the overpressure of a 25-megaton warhead simulating an air burst of a nuclear warhead against subscale capsules.

Deceptive Capsules

The Administration retained the option of adding capsules for deception or concealment of MX if the Soviet counterthreat grows and of deploying a ballistic missile defense system within the constraints of the existing antiballistic missile treaty with the USSR.

The capsule hardness levels for MX would cause the USSR to move away from recent trends to arm ballistic missiles with larger numbers of smaller-yield warheads.

The move to counter MX would lead toward what one official called "aggregating yield"—placing a single 25-megaton warhead on a single booster, such as the SS-18, in what is known as reverse fractionation.

In the letter to Congress opting for closely spaced basing of MX, the President said he had decided to emplace 100 MX weapons, "now known as Peacekeeper," in superhardened silos in a closely spaced basing mode. Reagan added: "I am prepared also to consider deception and possibly ballistic missile defense, which are options if the Soviet Union continues its military buildup."

The column array near Warren AFB would operate with two underground launch control centers, and the MX basing array would be located near USAF/Boeing Minuteman ICBM fields in the area. The Air Force has 200 Minuteman missiles in 10-silo squadrons, each with a launch control center, in the vicinity of Warren.

Three sites for the MX column array are being considered near the airbase. Two would be northwest with the array oriented north-south, and the third site would be north of Warren with the array running east-west.

The soil composition surrounding the airbase in Wyoming is sandy and would help to attenuate the shock from a nuclear weapon detonation, according to service officials involved in site studies for MX.

Bringing the capsules close together in the array would force the USSR to target its reentry vehicles traveling close together, which would cause maximum defensive benefits from the fratricide effect.

Shallow Angles

It also provides what officials call a long, narrow threat tube, through which Soviet reentry vehicles must enter at shallow grazing angles, thereby making ballistic missile defense a more simple process.

The column array could be defended with nuclear-armed Spartan and Sprint interceptor missiles and up to 18 small, hardened phased-array radars mounted in superhardened capsules.

The walls of the MX capsules would be 6-8 ft. thick and contain steel reinforcing rods for strength. This compares with Minuteman silo walls, which are approximately 1 ft. thick.

"The MX capsule would be a robust, resilient structure with the canister launcher inside," a Defense Dept. official

House MX Division Nearly Equal

Washington—House Appropriations Committee and the House are nearly evenly divided on whether to approve funding for the MX missile and its basing mode now that President Reagan has announced selection of a Dense Pack method and site in Wyoming.

Rep. Jack Edwards (R.-Ala.) said he expects the issue to be decided by a one or two vote margin when the full House Appropriations Committee, on which he serves, votes on MX funding Nov. 30.

Rep. Richard Cheney (R.-Wyo.) said following a White House briefing on the decision that MX funding was approved by the House last summer on a vote of 212 to 209. "At this point I think the outcome is in doubt," he said.

Both Cheney and Sen. Malcolm Wallop (R.-Wyo.) said they support the location of the MX in their state because it will serve as a deterrent to the Soviet Union as well as an incentive to force the Soviets to negotiate.

Sen. John Tower (R.-Tex.) praised Reagan for a "courageous and decisive judgment on a controversial system." He said there are technical questions that need to be resolved, but those will be dealt with at hearings before the Senate Armed Services Committee.

"What has to be considered is not just the efficacy of the system as a deterrent alone, but the consequences of failure to deploy the system," Tower said. "Right now the Soviets have the capability with 25% of their force to wipe out 90% of our current land-based force. Given that, it was essential that we act now to improve the credibility of our deterrent—not just from the standpoint of protecting our own security, but from the standpoint of having a good negotiating position on strategic arms reduction."

Sen. Henry M. Jackson (D.-Wash.) reserved judgment on the basing mode, saying he had not been briefed on it. The debate will be on the role the MX system can play in bringing about a reduction in land-based systems, he said.

"I was involved 12 years ago on the antiballistic missile fight," Jackson said. "That was a classic example of where we went ahead and authorized the ABM system, but were able to negotiate a treaty that stopped that aspect of the strategic arms race."

Rep. Clement J. Zablocki (D.-Wis.) predicted the MX will be approved by the House in December.

"My concern is that should Congress not agree to additional funds or continued funds for the MX, this may be the wrong signal for the Soviet Union. I believe that in the lame duck session, with the site selected in Wyoming and since Wyoming has no objections, I think it will be approved by the House of Representatives members knowing it will not be in their districts," the congressman said.

said last week. "The missile will be self-contained with its own electronics and ejection mechanism."

A hydraulic system will be employed so that the MX can break out of its canister even if tens of feet of debris cover the capsule headworks, according to the official. He added that this has already been demonstrated in subscale capsule tests.

'Brute Force'

The technology to harden MX capsules is described as simple, but "a brute force issue." "If we need to, we can always add another foot of concrete, and with the hardness levels, closely spaced basing brings about the fratricide effect," the official continued.

The Defense Dept. nuclear weapons expert said that under the fratricide theory, gamma, X-ray and neutron radiation given off within microseconds of the nuclear warhead detonation can destroy the trigger electronics of incoming reentry vehicles. The nuclear materials pit can be melted, reducing or destroying the yield of incoming warheads.

"Within tens of seconds after detonation, the blast can rupture or deflect incoming warheads, and the fireball causes the loss of the blast effect because there is no oxygen to couple with," he said.

The detonation of the first warhead would send debris tens of thousands of feet in the air, where it would remain for up to 30 min. Incoming reentry vehicles traveling at speeds aproaching 5,000 mph. would encounter the particles in the debris and the kinetic energy would erode the warhead seriously.

After the dust from a nuclear warhead attacking the MX array subsided, the missiles could be launched in a responsive attack before the USSR could fire again to penetrate the cloud of debris. The MX launch velocity would be much less than the velocity of the incoming reentry vehicles, permitting flyout.

The payload of MX is protected by a hardened titanium shield, and ablative material covers the missile. Each MX will be armed with up to 10 reentry vehicles, each with a warhead with a yield of 335 kilotons. The Mk. 21 advanced ballistic reentry vehicle will be the system used on MX, and the advanced guidance system will provide a circular error probable of 480 ft. for the weapon.

The Soviet SS-18 in contrast now has a circular error probable of 850 ft. That accuracy is expected to improve in the late 1980s to approximately 600 ft.

"But Soviet nuclear war planners will be faced with a dilemma with closely spaced basing," one Defense Dept. official said. "They will need a ground burst to dig out the MX capsule using a very-large-yield warhead, but they need to avoid fratricide, and this means a lower yield warhead using an air burst so that Soviet force planning is compounded against MX."

Townes Panel

One Defense Dept. official said the MX study panel headed by Charles Townes, University of Califonia professor, studied the USSR's nuclear weapons force and the projected improvements and found the Soviet Union "would have little confidence whether a successful attack could be mounted and count on overcoming MX."

Improvements beyond the current or projected capabilities for the USSR could be detected and the growth options for MX could be instituted to mitigate advances in complicated fuzing techniques and larger yield earth penetrator warheads. These changes would take time to develop and deploy, and the Soviet Union would find it difficult to test these improvements realisitically, the official pointed out, especially with the limited threshhold test ban treaty.

Officials explained that deep under-

BMD Prospect

Washington—Ballistic missile defense for the MX closely spaced basing mode will not be needed before the end of the century, a White House official said last week.

"Any BMD will not be needed before the end of the century, and it will involve exo-atmospheric technology," the official said. "We have no plans to deploy BMD. We have not included any long-lead procurement funding in any of the plans."

The official also commented on the need for private land in addition to that required at Warren AFB, Wyo.

"It depends on the Soviets," he said. "It may be logical sometime in the future to close down Minuteman and convert to a wing of MX 10 years from now. Currently that is not the case.

"Cheyenne, Wyo., was chosen because of the operational considerations, target coverage and easy communications linkage to Omaha. Secondly, it is a missile base, and it is a logical place to deploy these missiles."

ground basing research and development would continue for MX for use in the 1990s as an option, and that vigorous ballistic missile defense research and development would be conducted to advance the technology.

A Sentry defensive system, however, could be deployed around the MX column array if required, using existing defensive hardware with improvements. The system would have 61 Sprint and 39 Spartan interceptors.

The intelligence estimates are that the U. S. "will have a lead time of a couple of years and will see the evidence early enough for this option," the Defense Dept. official said.

The 1990s is considered the period when ballistic missile defense will be required, he added.

President Reagan said closely spaced basing will require only half as many missiles as the earlier plan and will fit into an area of only 20 sq. mi.

"It is the product of around-the-clock research that has been under way since I directed a search for a better, cheaper way," he said. "I urge the members of Congress who must pass this plan to listen and examine the facts before they come to their own conclusions." □

Basing Found To Meet Treaties

Washington—Closely spaced basing of the MX strategic missile would be consistent with the existing U. S./Soviet arms control agreements, would enhance verification of compliance with arms treaties and can be accommodated within U. S. arms reduction proposals enunciated by President Reagan last May 9, according to State Dept. officials.

"Closely spaced basing clearly does not undercut SALT agreements in any respect," officials said, referring to two previous U. S.-Soviet arms control agreements, one ratified by the U. S. Senate, the other not.

"The closely spaced basing system does not involve fixed launchers as set forth in SALT," they said. "The closely spaced basing system will be a canister specifically designed to be capable of being transported from one vertical shelter to another. The vertical shelter, although fixed, is not a launcher. The transportable canister itself contains essentially all the equipment needed to launch the missile."

Questioned about whether a closely spaced MX should be characterized as a fixed or mobile weapon system, the State Dept. said it was neither. Although not a fixed system because the MX canister could be shifted from one vertical shelter to another, "On the other hand, because CSB's operational concept envisions launching MX only from a protective silo, not from its transporter, it is not a purely mobile system."

If the U. S. chooses eventually to employ ballistic missile defense, State Dept. officials said, it could be done within the provisions of the U. S./Soviet Antiballistic Missile Treaty.

In its proposals for the Strategic Arms Reduction Talks (START) now going on in Geneva, Switzerland, the U. S. called for a first-phase limit of 5,000 ballistic missile warheads of which no more than 2,500 could be deployed on land-based ballistic missiles. The total number of ballistic missile launchers would be limited to 850 (AW&ST June 14, p. 25).

The MX deployment plan calls for 100 missiles armed with a total of 1,000 warheads and, according to the State Dept., "Other less-capable systems would be reduced to remain within our proposed START numerical limitations." □

Defense Dept. Reviews Lie Detector Use

Washington—U. S. Defense Dept. is reviewing its 1975 directive on internal security, particularly in the wider use of lie detectors in screening personnel and in tracking down security breaches and leaks to the press.

A draft directive, sent by the Office of the Under Secretary of Defense for Policy to the Office of Personnel Management (formerly Civil Service Commission) for comment, promptly was leaked to the Washington Post.

This reopened intense public discussion that started last January when Deputy Defense Secretary Frank C. Carlucci asked members of the Defense Resources Board to volunteer for polygraph tests in an effort to find a Defense budget leak (AW&ST Jan. 18, p. 15).

Once the Post printed the story, it was left to Under Secretary of Defense for Public Affairs Henry E. Catto, Jr., to face a blizzard of questions at a Pentagon briefing. Here are some of them, with his answers:

Q: Are you saying here that this change is aimed not at news leaks but at espionage? Is that what you are saying?

A: I'm saying that what we want to do is try to minimize and let's keep it in mind that there is no change yet, that's the first thing. If something does take place, it will be to minimize the leakage of sensitive information to our opponents abroad. . . .

Q: There is a substantial body of opinion not solely shared by reporters that you tell much too little about how you are spending their money. You determine what is secret and damaging to the country and then you lie detector people when you say it gets out because you say it goes to the enemies of the people, though you won't give us an example.

A: Well, I think that the first thing to keep in mind here is that the members of the press are not disinterested in this. You are not a disinterested party because you are the primary beneficiaries of the very problem that we are seeking to cure.

Q: The primary beneficiaries are the readers.

A: No, the primary beneficiaries are those of you who are engaged in a very vigorous professional competition in order to get the news to the people. So I don't think you can ever look at it quite the same as we do. . . .We all agree that Defense Dept. cannot and should not publish everything that is going on. You all would like to know as much as possible. What happens in between is a very gray area [that] is an art form to determine where to set the parameters. . . . Keeping in mind always the need and right of the public to know and the temptation of bureaucrats to cover up, because it exists, we have to balance that against a very real national security problem that we have. . . . Espionage is a factor, I don't think there's any question on that.

Q: How are polygraphs going to solve that problem?

A: Polygraphs can help pinpoint a quaint custom of [the Pentagon] which is the arrogating to oneself, if one is an employee, the right to determine what shall be classified and what shall not be. We think that this has to be an orderly process, not one that is subject to the whims or political persuasion or prejudices of an individual who may disagree, for whatever reason, with a decision that's about to be taken and who may want to sway congressional opinion or whatever; i. e., we want to discourage people with hidden agendas, from free use of that kind of leak in order to, outside the democratic process, determine what's going to be known and what's not. . . .

Q: Can we have a look at the directive since it is not classified and we all would like to enter into the debate?

A: I think you have done rather nicely already. I mean, speaking blind. You have done a nice job.

Q: So you would have no objections to handing out the directive?

A: I'm not prepared to declassify the directive.

Q: It's not classified.

A: I'll take that under consideration.